SIRTF

Space InfraRed Telescope Facility

(SIRTF)

Observing Policies

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These observing policies pertain to all categories of science observations made with the Space InfraRed Telescope Facility (SIRTF), unless explicitly stated otherwise.

1 Definition of Science Observing Time

All of the wall-clock time required for the execution of a specific observation, by means of an Astronomical Observation Request (AOR), will be charged to that particular AOR. This assessment of observing time starts with the beginning of the sequence of events associated with the AOR and continues until the completion of the events in that AOR. Assessed time shall include all science integration time, readout time, internal calibrations, and routine instrument/spacecraft motions embedded within the AOR.

In addition, there will be overheads assessed to every AOR in order to distribute necessary Observatory activities among all science observations. For the initial *Call for Proposals (CP)*, each AOR will be assessed three minutes to account for telescope slew time, regardless of the actual time utilized. The algorithm used to calculate observing time, including standard overheads, will be integrated into the software time estimators that scientists will use in planning SIRTF observations. Overhead burdens will be reevaluated, and perhaps redefined, from one observing cycle to another.

Target of Opportunity (ToO) observations and Solar System observations that require late ephemeris updates (*i.e.*, within 1-2 weeks of the observations) will be assessed additional overhead burdens based on the degree of disruption to the onboard observing schedule (§5.1). These overhead burdens are summarized online within the 'Proposal Kit' section of the SIRTF public Web site and are subject to change in future CPs.

Any proposals seeking multiple-instrument observations on timescales shorter than the normal instrument campaign (3-10 days) will be assessed special overheads in observing time by the SSC. These overheads will reflect the observing time estimated to be lost to other programs if the approved ToO observations are activated, and will be factored into the proposal review conducted by the TAC. These overhead burdens are summarized online within the 'Proposal Kit' section of the SIRTF public Web site and are subject to change in future CPs.

The total observing time assessed to a program shall consist of the sum of observing times for each of its constituent AORs, including applicable overhead burdens.

Note that Observatory engineering, calibration, and telemetry activities are functions of the SIRTF Science Center (SSC), and the wall-clock time required to perform these functions is accounted for separately from the science observing time. Any estimates of General Observer time published as part of a *Call for Proposals* will refer to the science observing time, and will be derived after adequate time for SSC/Observatory activities is reserved.

2 Duplicate Observations

In order to ensure the most efficient use of SIRTF, proposed observations that duplicate those already executed or approved for execution (and therefore in the Science Operations Database) will not be permitted without the explicit approval of the SSC Director, or designee. Archival data should be used whenever possible to accomplish the science goals of any proposed investigation.

2.1 Definitions

Given the large number of SIRTF observations annually (> 20,000), it is important to define quantitative thresholds which permit automated checking of AORs to identify *candidates* for duplication. These flagged AORs will be checked manually by SSC staff to ascertain the degree of duplication between the candidate observations. Two or more observations are considered to be *potential* duplicates when one of the conditions described in criterion #1 is met and both criterion #2 and criterion #3 apply:

1(a) Both of the observations are executed with the same Astronomical Observation Template (AOT), *or*
1(b) One of the observations is executed with the IRS Staring-Mode Spectroscopy mode and the other is executed with the IRS Spectral Mapping mode *and* the observations are conducted with the same IRS module, *or*
1(c) One of the observations is executed with the MIPS Photometry/Super-Resolution mode and the other is executed with the MIPS Freeze-Frame Scan Mapping mode.

2. The integration time per pixel for each observation agrees to a corresponding factor of three in sensitivity; *and*

3. The areas on the sky covered by two proposed imaging observations overlap by more than 25% of *either* of the fields/areas being compared. For spectroscopic observations with IRS, the area overlap shall mean that the targets are considered to be potential duplicates if the target positions are closer together than one-half of the slit length of the appropriate IRS module. Note that for very large programs, an area overlap of less than 25% could still translate into a significant amount of SIRTF observing time. Observations with area overlaps less than 25%, but greater than 10 hours of SIRTF observing time, will receive additional scrutiny by the SSC and may be disallowed by the SSC Director.

Note that a lengthy observation within the same observing proposal may be segmented because of operational constraints, and that the series of component observations will not be deemed to be duplicates.

Newly proposed observations that are identified to be potential duplicates must be approved by the SSC Director. Approval will be contingent on a legitimate scientific justification for carrying out the new observations. Examples of observations that may be approved include: synoptic observations of time-variable phenomena and second-epoch (or later) observations searching for transient phenomena. Another example includes a large-area survey, where excising ("cutting out") a small area to avoid overlap with a previously cataloged observation is so inefficient that it increases the observing time for the affected observation. Finally, a proposed observation resulting from an evolution of the SIRTF AOTs

and which leads to a demonstrably better observation strategy for a particular science goal will be considered for approval.

If a new candidate observation is less sensitive than a previously accepted observation and if it meets the area overlap criterion above, it will always be considered a duplicate since the science objective of the new program can be achieved using the deeper observation.

In general, the data from an *approved* duplicate observation will be embargoed by the SSC (*i.e.*, not released to the second investigator) until the validation period of the original observation is completed.

2.2 Procedures

It is the responsibility of any investigator to avoid proposing duplicate observations, apart from the exclusions listed in this sub-section. Each *Call for Proposals* will be accompanied by a comprehensive list of targets and AORs previously approved (§3.2). To assist users in checking for duplications, the SSC will develop suitable software for checking newly proposed observations against a comprehensive catalog of approved AORs. [This capability may not exist in time to support the Legacy Science proposal process. However, Legacy Science investigators must only submit a representative sample of AORs at the time of proposal submission.] Any newly proposed AOR meeting the criteria listed in §2.1 will be deemed a potential duplicate observation. If the new observation is obviously a different target, it will be permitted. If manual inspection reveals the new observation to be a duplicate, the proposed observation will (in general) be forbidden.

One exception to the duplicate observation policy described in §2.1 is the case where a series of observations of the same target are intended to search for time-variable phenomena. In this case, a single observation of the same area of the sky will not disallow the time-series observations. On the other hand, if the time-series observations occur *before* the single observation, it will disallow the single observation (since the objectives of the single observation could be achieved by using data from the time-series observations).

Previously accepted observations (*i.e.*, AORs already entered into the Science Operations Database, or SODB) will always take priority over newly proposed observations. A new or modified AOR that is found to be a duplicate of an existing AOR cannot be entered into the SODB without special permission granted by the SSC Director. To be granted this dispensation, the investigator who stands to lose a proposed duplicate observation must file a request to the Director, describing why the AOR already entered in the SODB cannot be utilized in the proposed investigation. Basing a request solely on the time lag associated with gaining access to data from an existing AOR (whose observation may not yet have been executed and whose data may not enter the public domain until proper validation) will be insufficient, unless such a delay will significantly compromise the timing and integrity of the proposed investigation. [Affected investigators can always contact the Principal Investigator of the original AOR to seek access to the required data.]

Investigators must describe their observations unambiguously by completing AORs. When proposals are submitted, observations that are deemed to be duplicates of observations already listed in the SODB will be noted by the SSC during a technical reviews, and this information will be provided to the Time Allocation Committee (TAC). In general, the TAC shall not recommend duplicate observations. If the TAC elects to recommend a duplicate observation, it must specify in writing (to the SSC Director) why the duplicate observation(s) should be permitted.

During the period when Guaranteed Time Observers (GTOs) are submitting and revising their AORs, the newly submitted AORs will be verified for non-duplication of previously accepted AORs. To facilitate this process, modifications to approved AORs will be scheduled in a sequential manner, with various categories of observers (GTOs, Legacy Science, GOs) permitted to modify their AORs according to a schedule to be developed and disseminated by the SSC.

The SSC Director shall have final authority to either allow or disallow duplicate observations.

3 Declaration of AORs

As a general rule, the earliest description of an approved observation -- via completion of a valid Astronomical Observation Request (AOR) -- shall reserve priority rights in the case of duplication(s).

3.1 Definition of Approved Programs

For every category of SIRTF observing time, an approved program is established in a different manner.

For Guaranteed Time Observations (GTOs), the approved program consists of the complete list of AORs and corresponding program abstracts submitted in response to a *Request for GTO Program Submission* issued by the SSC. The Project Scientist has the responsibility to verify that the submitted programs are conflict-free.

For Legacy Science projects, the approved program will consist of the full list of AORs submitted in July 2001, along with a project abstract. The SSC will conduct a review shortly after the Legacy Science AOR submittal to assess the consistency of the submitted AORs with the program as approved by the Legacy Science Time Allocation Committee.

For General Observer (GO) investigations, the approved program will consist of an abstract and either of the following: (i) all of the original AORs submitted as part of a GO proposal that has been accepted without any modifications recommended by the TAC, or (ii) a revised list of AORs that has been modified in response to specific TAC recommendations.

For Director's Discretionary Time (DDT) observations, the approved program consists of the AORs based on the approved DDT proposal and the corresponding abstract.

3.2 Specification of AORs

As the pre-launch Science Operations Database (SODB) is constructed by the SSC, a phased approach will be taken to entering AORs into the database. The GTO investigators will enter their AORs into the SODB first. The Legacy Science teams will then enter their AORs, avoiding duplication with the GTO observations (§2) and with the First-Look Survey (FLS) observations. [Information about the FLS is available on the SIRTF public Web site.] After the SIRTF launch, the Cycle-1 GO investigators will enter their AORs into the database, avoiding duplication with existing GTO and Legacy Science AORs, and with the FLS observations.

Each *Call for Proposals* (CP) will include a *Reserved Observations Catalog (ROC),* a tabular list of targets and observing modes excerpted from the SODB. The second and final version of the *Legacy Science CP* will include a list of proposed GTO observations/project abstracts and FLS observations, referred to as version zero of the ROC. Once Version 2 of the *Legacy Science CP* is issued by the SSC, the ROC cannot be altered until the selection of approved Legacy Science teams has been announced by the SSC Director (see §4 on modification of approved programs).

Once the Legacy Science teams have completely specified their observations (via completed AORs) by July 2001, an updated ROC will be prepared for release of the Cycle-1 General Observer *Call for Proposals*. This version of the ROC will include a consolidated list of GTO and Legacy Science targets and observations (accompanied by project abstracts), and the First-Look Survey observations. The Cycle-1 GO investigators will then propose against this consolidated ROC, which shall remain unaltered through the completion of In-Orbit Checkout.

The Cycle-2 General Observer CP will be accompanied by an updated version of the ROC, which will include a consolidated list of targets and observations for GTO, Legacy Science, FLS and Cycle-1 GO programs.

Beginning with Cycle-3, the GTOs will not have priority in target selection. Therefore, the next updated version of the ROC will be comprised of the accepted science program after Cycle-2. Target conflicts in Cycle 3 between GTO and GO observing requests will be resolved by the Time Allocation Committee, according to the precepts to be defined prior to launch.

4 Modification of AORs

To accommodate the inevitable need of investigators to modify and refine their approved observations, procedures are established to allow for this process. The intent of these procedures is to allow adequate flexibility in modifying a SIRTF observing program to maximize the scientific value of an approved observation. The guiding principles underlying these procedures are:

- All programs executed by SIRTF are properly reviewed and approved. The approval process described below is intended to ensure that the modified program, as executed, is approved and avoids duplicate observations.

- All modifications shall be such that the program stays within its originally allocated observing time.

The procedures described here exclude the procedures that will be followed in the catastrophic loss of a major instrumental or Observatory function.

4.1 Types of Modifications

An Astronomical Observation Request (AOR) in the Science Operations Database (SODB) can be modified electronically by the Principal Investigator, according to the precepts and schedule outlined below. Once an AOR has been scheduled for observation, typically a few weeks before execution, it cannot be modified without approval (which will be rare) of the SSC Director.

All requests for modification of approved AORs must be approved by the SSC Observer Support Team, which will characterize the request as one of two types. *Minor modifications* consist of small changes of target parameters, typically a few arcseconds in celestial coordinates, or small changes in AOR execution time (< 20%), subject to the total observing time in an investigation remaining constant. Minor modifications could also include small changes of other parameters in the AOR (*e.g.*, change to high-dynamic mode in the IRAC AOR), as long as the changes do not alter the scientific content or intent of the original AOR.

Major modifications to an individual AOR consist of those changes that would substantially alter the scientific content or intent of the AOR. Apart from the exception noted below, major modification of AORs can only be granted to GTO and Legacy Science investigators. Examples of major modifications include:

- Changing the observing mode for an observation (*e.g*., from MIPS scan map to IRAC imaging).
- Changing the execution time of an AOR by 20 percent or more, thereby increasing the probability that duplicate observations might arise.
- Changing the sensitivity by a factor of 1.5 or more.
- Changing the target coordinates, or boundary area, by an astronomically significant amount.
- Changing the target to a different target judged by the investigator to be scientifically equivalent to the original target.

The execution of an approved observation may become infeasible (§12) or prove to be scientifically useless because of unanticipated circumstances. If these events occur, and if a General Observer can *a priori* demonstrate that the approved AOR will yield useless data, the GO Principal Investigator can submit a request to make major modifications to the AOR. The proposed modifications must be consistent with the original scientific intent of the approved observation and the observing time granted. In addition, it cannot duplicate any other approved observation, and must be approved by the SSC Director.

Requests for major modifications to *any* approved observing program or AOR must be made to the SSC Observer Support Team, and must be accompanied by adequate justification. Modifications are contingent upon approval by the SSC Director, or designee. Once approval for a modification is approved, the requestor may modify the AOR/program, with assistance provided by SSC Observer Support Team. The latter is responsible for insuring that the modifications are implemented as approved.

4.2 Blackout Periods

There will be blackout periods, during which no *major* modifications to approved AORs or programs can be performed. In general, the *Reserved Observations Catalog (ROC)* is frozen, and major modifications are not permitted, during blackout periods timed to coincide with the solicitation of General Observer investigations. The Reserved Observations Catalog/AOR blackout schedule through the first 2.5 years of science operations is available on the SIRTF public Web site.

An exception to the ROC freeze during ‘active’ CPs will be granted during the Cycle-1 solicitation process, in order to enable GTO and Legacy Science investigators to react to significant on-orbit variances from pre-launch predictions. The SSC Director will issue guidelines to the GTO investigators and Legacy Science teams that define which AORs can be modified during this period.

5 Targets of Opportunity

Targets of Opportunity (ToO) are transient phenomena whose timing is unpredictable. They include objects that can be generically identified before the onset of such phenomena (*e.g.*, recurrent novae, variable stars) and predictable phenomena that can be expected, although whose precise timing cannot be specified *a priori* (*e.g.*, newly discovered comets, novae, supernovae, gamma-ray bursts).

Predictable phenomena whose exact timing may remain uncertain at the time of proposal submission should be submitted in response to a General Observer *Call for Proposals (CP)*. Observations of completely unanticipated phenomena can be requested through Director's Discretionary Time (DDT) procedures (see SIRTF public Web site for details).

By its very nature, a ToO warrants urgent consideration and attention, and unique procedures to handle such observations are therefore be accommodated within all categories of SIRTF observing programs. At the time of proposal submission, investigators will classify each ToO request, based on the degree to which the execution of such an observation affects normal SIRTF scheduling and observing procedures (§5.1).

A General Observer proposal must include a valid Astronomical Observation Request (AOR) for each predictable ToO observation. The AOR must be completed in as much detail as possible, lacking perhaps the precise target position (*i.e.*, a "null target") and refined integration times. The proposal must present a detailed plan of observations that will be implemented if the specific event occurs. Moreover, it must also provide an estimate of the probability of occurrence of the specified event during the relevant SIRTF observing cycle(s).

The SSC Director reserves the right to request early release of ToO data by the Principal Investigator when such a release is deemed to be of interest to the general public, as determined by the Director.

5.1 Classification of Impact

At the time of proposal/AOR submission, investigators must classify each ToO observation into one of three categories based upon the impact that the observation will have on the normal SIRTF scheduling and observing procedures (if approved). The classification scheme is based solely on the time elapsed between the activation of a Target of Opportunity AOR (§5.2) and the execution of the corresponding observation:

High-Impact	< 1 week (normally a minimum 48-hour turnaround)
Medium-Impact	1-3 weeks
Low-Impact	> 3 weeks.

Apart from the overhead burdens applied to all SIRTF observations (§1), the SSC will impose no additional overheads on low-impact ToO observations. The SSC has developed separate calculations of Observatory overheads to be assessed against the high- and medium-impact categories of ToO observations. Current estimates of these special overhead burdens are summarized online within the 'Proposal Kit' section of the SIRTF public Web site and are subject to change in future CPs.

An investigator will self-determine the appropriate category, based upon the maximum delay (in their judgement) that is scientifically acceptable between the activation of an approved AOR and the execution of the observation. This information will be useful in permitting the SSC and the Time Allocation

Committee (TAC) to scientifically assess the value of the ToO observation vis-à-vis other approved observations.

The Principal Investigator of a 'high-impact' ToO observation must include, as part of the observing proposal, strong justifications for a rapid turnaround of ToO data by the SSC and (if relevant) compelling evidence to support the need for rapid instrument changes. In general, the more disruptive the ToO observation is to normal SIRTF scheduling and operations, the stronger the justification must be to approve the proposed observation.

Any ToO proposals seeking multiple-instrument observations on timescales shorter than the normal instrument campaign (3-10 days) will be assessed special overheads in observing time by the SSC. These overheads will reflect the observing time estimated to be lost to other programs if the approved ToO observations are activated, and will be factored into the proposal review conducted by the TAC.

5.2 Activation of AORs

An approved request for ToO observations via the General Observer program will be executed only in the event that the specified phenomenon actually occurs within two years of proposal selection via the relevant *Call for Proposals*. For an approved ToO, a request for AOR activation must be electronically submitted to the SSC Director by the Principal Investigator (PI) via the SSC HelpDesk (*sirtf@ipac.caltech.edu*). Following the request for activation, the SSC will ascertain the feasibility of conducting the ToO observations, taking into account sky visibility and the schedule of SIRTF instrument campaigns. The observer will also submit a revised AOR, with precise coordinates and integration time. If the observations cannot be conducted on a schedule requested by the investigator, the SSC Director will consult with the PI on the scientific utility of later observations. The SSC Director must issue final approval for any high-impact ToO observations requiring an interruption of the onboard observing schedule.

In the event that a ToO observation expires without execution, the allotted observing time will be returned to the General Observer pool and the SSC will explicitly publicize this information as part of the next *Call for Proposals*.

5.3 Regulation of Observations

The SSC Director will rely on the recommendations of the Time Allocation Committees to assess the benefits of a proposed ToO observation against any disruptions to the efficient planning and scheduling of science observations with SIRTF. Because of the heavy impact that high-impact ToO observations will have on the short- and medium-term SIRTF schedule, no more than six of these rapid-execution ToO observations will be approved and executed in any given SIRTF observing cycle. Moreover, the SSC does not intend to approve any high-impact ToO observations within the first six months of science operations.

6 Generic Targets

Generic Targets denote observations that fail to qualify as Targets of Opportunity (*i.e.*, they have more refined and predictive spatial and temporal information than ToOs), and can be scientifically described, but lack *precise* celestial coordinates or brightness estimates *at the time of SIRTF proposal submission*. A SIRTF generic target can be selected from a complementary observing program with SIRTF, or with any other observatory, but one where the conditional observations (assumed to be under the control of the SIRTF Principal Investigator) are scheduled, but not yet executed or analyzed prior to the SIRTF proposal deadline.

An investigator may propose observations of generic targets, describing them in as much detail as possible in a SIRTF observing proposal. The investigator must submit AORs with celestial positions accurate to within 2 degrees (radius), and with execution times specified to within a factor of 1.5.

The Time Allocation Committee will peer-review the proposed observations of generic targets. After the complementary observations are obtained and analyzed, the SIRTF Principal Investigator must modify the generic target AOR and include the precise celestial coordinates and integration time before the observations can be scheduled.

An example of a generic target involves SIRTF follow-up observations of targets culled from a ground-based supernova search program. In this case, the investigator would demonstrate that scheduled ground-based observing time is likely to yield enough supernovae to create a credible SIRTF proposal. However, the initial (confirming) observations have not yet been made at the time of SIRTF proposal submission. Once the ground-based data have been taken, the proposing investigator must specify the celestial coordinates of the new supernovae, an integration time, and submit a completed AOR at least three weeks prior to observing. [If a more rapid response is required, the observations must be treated as a Target of Opportunity; see §5.]

Generic targets could be a primary component of SIRTF second-look observations (§7). For example, generic targets describe the situation where SIRTF imaging data yields discoveries of new objects for which SIRTF/IRS spectroscopic second-look observations are desired, based upon selection criteria specified in the original science proposal.

6.1 Necessary Conditions

Proposals seeking to observe generic targets will be accepted for consideration through the normal processes if the following (relevant) conditions are satisfied:

- Rules pertaining to duplicate observations and priority of target selection (as specified in §2) apply. The basic principle is that the first observer who specifies the AOR with sufficient completeness to permit execution of the AOR has priority for the observation.

- The generic target observations are specified in celestial coordinates to < 2 deg (radius) in the initial AOR/proposal (see §6.2 for an exception pertaining to moving targets). The reason for submitting approximate coordinates is to enable the SSC to properly assess the over-subscription of various areas of the celestial sphere in making the observing time allocations.

- The generic targets are selected from datasets that the proposing investigator has clear access to. The specification of generic targets from SIRTF Legacy Science projects for subsequent "second-look" categorization (§7) is limited to the pertinent Legacy Science team executing the approved project.

- Observations of generic targets that require timely execution of SIRTF observations and rapid turnaround of validated data to the investigator (in order to specify second-look SIRTF observations) are accepted at the risk to the observer. In other words, the SSC cannot guarantee that the sequence of SIRTF observations and follow-up observations will be executed completely. Generic target observations that are not completed during the given observing cycle are not carried over to the following observing cycle, and must be requested via the next proposal cycle.

6.2 Moving Targets

Generic moving targets meet all of the criteria above, except that the target positions for SIRTF observations cannot be specified within 2 degrees because these objects move significantly in position on the sky between their discovery and subsequent SIRTF observation. Proposers must submit an AOR for a generic moving target with a target position to be determined (from NAIF ID or orbital elements).

Generic moving targets, like the analogous celestially fixed targets, must be selected from observations under the control of the investigator. The proposer must estimate the number of such targets to be observed with SIRTF, based on well-defined criteria. Examples of generic moving targets include near-Earth asteroids, main-belt asteroids, Centaurs and Kuiper Belt Objects. Because of the time urgency of observations, comets near perihelion should be treated as Targets of Opportunity (§5).

7 Second-Look Observations

A scientifically important factor in planning and implementing any category of observational investigation with SIRTF is the ability to discover new phenomena or peculiar objects and then to characterize a sub-sample of them in a timely manner -- for the benefit of the entire SIRTF user community. *Second-look observations* (SLOs) are deemed to be a *predictable* element of an integrated SIRTF observing program, even if they cannot be completely described at the time of proposal submission. Requests for SLOs must be included in the original proposal and must be described in as much detail as possible. The SLO concept applies to GTO, GO, and Legacy Science investigations.

For example, an investigator can propose to conduct IRAC or MIPS imaging observations to identify objects with extreme color ratios, and then conduct IRS spectroscopy to characterize these objects. The spectroscopic observations comprise the second-look observations, and comprise a legitimate portion of the proposed scientific investigation. There is no limit to the fraction of proposed observations that may be characterized in a program as second-look observations, and the SLOs can include generic targets (see §6). In all cases, the SLOs must be justified as an integral part of the proposed science program at the time of proposal submission.

Validation periods for SLOs that are part of an approved GTO or GO program are the same as for any other element of that GTO or GO program. Data from SLOs conducted as part of a Legacy Science

project enter the public domain as soon as the basic calibrated data are pipeline-processed and verified by the SSC.

8 Commissioning of AOTs

An Astronomical Observation Template (AOT) must be tested, validated and commissioned by the SSC before routine science observations can be executed with the corresponding observing mode. The commissioning of an AOT entails a wide variety of activities, and includes the verification of spacecraft command sequences, proper operability of the science instrument, and the proper input of spacecraft data and output of calibrated data by the relevant automated processing pipeline at the SSC.

Present plans call for four of the seven AOTs to be commissioned during In-Orbit Checkout. The first-generation AOTs are:

- IRAC Mapping/Photometry
- IRS Staring-Mode Spectroscopy
- MIPS Photometry/Super-Resolution Imaging
- MIPS Freeze-Frame Scan Mapping.

These second-generation AOTs will be commissioned in time to support the Cycle-2 *Call for Proposals*:

- IRS Spectral Mapping
- MIPS Spectral Energy Distribution
- MIPS Total Power Measurement.

General Observer investigations proposed for execution in Cycle 1 are limited to use of the first-generation AOTs.

Observations proposed as part of a Legacy Science project and requiring any of the three second-generation AOTs must be submitted in response to the *Legacy Science Call for Proposals*. In practice, this means that the uncertainties in quantitative numbers associated with those AOTs (including sensitivity estimates) are likely to be larger than for the first-generation AOTs. Scheduling of approved Legacy Science observations utilizing any of the second-generation observing modes will be deferred until the corresponding AOTs have been commissioned.

Guaranteed Time Observers may utilize non-commissioned AOTs at their own risk (if the commanding sequences are available). Calibration must be performed by the GTO investigator(s). Any observing time used to conduct the calibration observations will be assessed against the GTO investigator's allotment of time.

9 Routine Calibrations

The SSC will establish and maintain the calibration of each SIRTF science instrument to levels specified in the individual instrument handbooks contained within the online *SIRTF Observer's Manual*. The *routine calibrations* to be executed by the SSC on behalf of the community will be described within each

Call for Proposals. Data resulting from routine facility calibrations will generally enter the public domain immediately upon processing and verification by the SSC.

The initial on-orbit calibration of the Observatory, including the three science instruments, will be performed during the In-Orbit Checkout period as part of the commissioning of each observing mode (or Astronomical Observation Template). Observations of celestial targets necessary to establish the calibration of each AOT will be part of the commissioning process for the AOT, and will not be subject to policies regarding duplicate observations (§2). If the SSC must use a previously approved AOR for routine calibration purposes, the resultant data will be embargoed from scientific utilization until the validation period of the original observation is completed.

After an AOT is commissioned for general use, the SSC will maintain the calibration of the AOT, and will conduct celestial observations, as necessary to maintain such calibrations. It is expected that calibration observations equivalent to about one day per week will be required, at least for the first year of the mission. Celestial and internal calibrations will be a component of each instrument campaign. (The scheduling of SIRTF observations will generally be blocked into instrument campaigns of 3-10 days duration.) The celestial calibrations will be counted as part of the overall overhead of the Observatory, and will be assessed across all approved observing programs according to the precepts described in §1. Observations of celestial targets necessary to maintain the calibration of each AOT will not be subject to policies regarding duplicate observations.

The SSC will publish, as part of the *SIRTF Observer's Manual*, the expected and achieved calibration accuracy for AORs processed with the normal calibration pipelines. For observations that require a higher level of calibration, and therefore special calibration observations (see §10), it is the responsibility of the requesting investigator to include those special calibration observations as part of their proposed observational program. The SSC will process such observations through its normal data processing pipeline(s).

10 Special Calibrations

Any additional calibration(s) that are not included as part of routine calibrations (§9) conducted by the SSC will be regarded as *special calibrations*, and are the responsibility of the approved investigator. The observing time required to conduct such special calibrations will be charged against the observer's allocation and, for General Observers, must be included in the original proposal. The SSC will pipeline-process such observations through the normal data processing pipeline(s). The investigator is responsible for using these data for the special calibration requirements of their program. The normal data validation period applies to special calibration data that are part of an approved science program.

All SIRTF data, including routine and special calibrations, can be accessed and analyzed by appropriate SSC instrument specialists to assess instrument performance and to develop improved or necessary instrument calibrations. For special calibration data used in such a manner (and for all data subject to the standard validations periods), strict confidentiality will be maintained during the normal validation period.

11 Use of Parallel Observations

Only one SIRTF science instrument can be operated at any given time.

All of the science data obtained via a single Astronomical Observation Request (AOR) will be considered to belong to the requestor of the observation, and will be subject to the same data validation rules as the explicitly requested data. That is, the data validation rules and periods apply to *all* of the data collected via a specific AOR, whether or not the observer explicitly requested it as part of their proposed science program. The four-channel IRAC camera aboard SIRTF provides an example of such *parallel observations*. When imaging the sky at 3.6 and/or 5.8 microns, an offset field of view simultaneously collects images at 4.5 and 8.0 microns. All of the IRAC data are collected and processed via a single AOR, and hence are under the control of the Principal Investigator.

12 Infeasible or Non-Schedulable Observations

All approved SIRTF observations are accepted with the understanding that there can be no guarantee that the observations will actually be obtained. The SSC will make all reasonable efforts to execute all approved observations.

In specifying observations through the completion of Astronomical Observation Requests (AORs), the front-end graphical user interface to the Astronomical Observation Template (AOT) will not process invalid parameters. Therefore, a completed AOR represents a 'doable' observation, in principle. In practice, however, it could turn out that the actual execution of some observations could prove to be highly difficult or impossible. For example, on-orbit events may conspire to restrict the range of acceptable or safe AOT parameters, and thereby make previously approved observations *infeasible*. If the AOR can be modified to make the observation feasible, the Principal Investigator will be given the opportunity to make these modifications. Otherwise, the AOR will be abandoned without execution, and the SSC will explicitly publicize this information as part of the next *Call for Proposals*. Guaranteed Time investigators will be permitted to re-allocate the observing time from abandoned observations to another observation in their program. The usage of abandoned time for Legacy Science and General Observer observations will be determined by the SSC Director.

13 Failed Observations

A *failed observation* is one that cannot be calibrated, or where a significant fraction of the data is lost or severely corrupted, or where the data processing system (the "pipeline") is incapable of processing the observation. Some failures may result from instrument anomalies, while other failures may be due to the loss of data in transmission. The SSC will attempt to repeat observations that fail for reasons beyond the Principal Investigator's control.

If an investigator believes that an observation has failed or has been seriously corrupted or degraded (and has not been identified as such by the SSC), he/she can submit a written request to the SSC Observer Support Team for a repeated observation. Any request for a repeated observation must be filed within

two months of the investigator's receipt of verified data from the SSC. If the SSC concurs with the request, attempts will be made to repeat the observation. The SSC Director reserves the right, in cases where the request for a repeated observation is approved, to place the failed/degraded observations into the public archive immediately. The request for a repeated observation will not be granted when the PI has committed an error in specifying the AOR.

If an investigator has obtained more than 90% of the data in a planned and approved observing program, and the missing data are not uniquely important for scientific goals of the program, then the request for a repeated observation will not normally be granted. Any failed AORs comprising the incomplete portion of an observing program will be explicitly publicized by the SSC as part of the next General Observer *Call for Proposals*.

14 Publication and Dissemination of SIRTF Results

It is expected that useful scientific results obtained through SIRTF observations and archival research will be published in the scientific literature. All publications based on SIRTF data must carry the following acknowledgement:

> "Based [in part] on observations made with the NASA *Space Infrared Telescope Facility (SIRTF),* which is operated by the Jet Propulsion Laboratory, California Institute of Technology under NASA contract {ID#####}."

If the research was supported by SIRTF data analysis funds, in part or in whole, the publication should also carry the following acknowledgement:

> "Support for this work was provided by NASA through contract number {ID1#####}, issued by the Jet Propulsion Laboratory, California Institute of Technology under NASA contract {ID2#####}."

Institutional contract numbers will be posted on the SIRTF public Web site, and unique contract numbers for each investigation will be communicated to the Principal Investigator.

In papers describing SIRTF results, investigators should provide reference(s) to seminal papers describing the Observatory, including the relevant science instruments. These references will be posted on the SIRTF public Web site. Moreover, the SSC encourages SIRTF investigators to provide reference(s) to seminal Legacy Science project results, where appropriate.

The publication and dissemination of SIRTF science results is critical in assessing the success of the mission, and its contributions to NASA's strategic plans in space science. The SIRTF user community is reminded of the important responsibility inherent in utilizing this national resource, and in sharing the scientific results with the general public. The SSC Director encourages SIRTF investigators with newsworthy results to utilize the resources and services of the SSC Office of Community Support to help disseminate important results to the mass media and to the general public.